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THE NEW LOCAL ANÆSTHETIC—HYDROCHLORATE OF ERYTHROPHLEINE.

BY ADOLF ALT, M. D.

The disagreeable experience but recently made with the alleged local anæsthetic, gleditschine, cannot but caution us with regard to new drugs which are offered to the profession without having first undergone a careful chemical investigation. When, however,a few weeks ago it became known this side of the Atlantic, that Dr. L. Lewin, had announced to the Berlin medical Society, that he had found a new local anæsthetic in Erythrophleine, the alkaloid extracted from the bark of an African tree, Erythrophlaeum judiciale, I had no doubt that here we had to deal with a real new remedy and not with a fraud. I, therefore, tried to procure it, but in vain, when I received the following circular, which is here reproduced in full.

ERYTHROPHLEINE.

The Active Principle of Erythrophlæum Guineense.

From a most interesting paper, read a month ago (January 11th, 1888,) before the Medical Society of Berlin, by Dr. L.

Lewin, I extract the following concerning a drug that promises much. If it possess the properties and power that Dr. Lewin positively states it does, it will probably supersede Cocaine, because of the advantages it presents over even that most valuable alkaloid.

The Hydrochloride of Erythropleine (made by E. Merck, of Darmstadt,) is readily soluble in water. A *two per cent.* solution in a dog's eye renders it insensible for from *10 to 24 hours.* This solution is *much stronger than need be* for anæsthetic uses, as will be seen as we proceed; for Dr. Lewin states that "solutions of the strength of one-fourth or one-tenth or one-twentieth of one per cent. produce anæsthesia of the cornea and conjunctiva, continuing for from several hours up to two days, and gradually decreasing in intensity during that time. The action is altogether local, and if a solution of it be injected into the *eyelid* of an animal, this becomes so insensible that touch does not induce motion, while the eye itself retains perfectly its sensibility."

"To give an idea of the powerful action of this substance, I mention the following: If we make a solution of the proportion of $^1/_{10}$ gramme to 100 grammes of water, *e. i.*, $^1/_{10}$ gramme to 2000 drops of water, (approximately $^3/_4$ of a grain to one fluid ounce or a solution of about $^8/_{100}$ of one per cent.—McK.) and of this inject three full drops into the eye, full anæsthesia is produced, (by 0.00015 grammes Erythrophleine hydrochloride) (or twenty-three ten-thousandths of a grain—McK.) If from 0.0005 grammes to 0.0015 grammes of this solution be injected into a guinea-pig, such an insensibility is produced in the injected part that one can cut these otherwise so sensitive animals deeply, down to the muscles without observing any symptom of pain."

"In frogs which have been tetanized, no further tetanus can be produced upon the injected point. After an injection of Erythrophleine in a limb, it can be pierced without any reaction. After a subcutaneous injection of an amount equal to one-fourth of a hypodermic syringe of a two per cent. solution, such an insensibility is produced in these animals in about fif-

teen minutes at the point of injection, that touching them with concentrated sulphuric acid, or with a red-hot needle, is not felt."

"I, myself, dropped into a wound in my finger, which had been caused by glass and was very painful, a few drops of a two per cent. solution, and the pain which had before that been persistent and had increased with pressure, ceased after about ten minutes, and could not be re-established by the firmest pressure. This analgesy persisted for about an hour and could be continued by entire days."

As to the general constitutional effect of this drug, Dr. Lewin says but little, except that in therapeutic doses it has a "digitalinic effect upon the heart."

His investigations began in an attempt to determine the source of the "Haya poison," used by the natives of Western Africa as an arrow poison, and, little by little, his experiments led to the assurance that it was prepared from the Erythrophlæum.

I have to-day about all of this alkaloid there is in the United States, and that is comparatively little. I expect a larger quantity of it very soon, and as I understand that Mr. Merck believes it has a great future and is preparing it on a large scale, and as the bark from which it is extracted is plentiful and cheap, we are likely to have plenty at reasonable rates. It is worth to-day about $1.00 per grain. Solutions of say one-half grain to the fluid ounce would seem to be about the proper strength for use in the eye. Before much of it is injected into the circulation more should be known of its constitutional effect, especially with reference to the heart. See article on "Erythrophlæum" in both *Wood, Remington & Sadtler's Dispensatory* and in *Stille & Maisch's Dispensatory*.

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I have since received the *Centralblatt f. Augenheilkunde*, for January 1888, in which Lewin's reports are given, which he made at the meetings of January 11th and 25th. From these I

extract the following passages for the benefit of our readers: "* * * The anæsthesia produced by a solution of hydrochlorate of Erythrophleine is as intense as can be imagined. When a solution of $^1/_5\%$ is instilled into the eyes of cats, rabbits, etc., an anæsthesia is produced in from 15 to 20 minutes which *lasts from* 1 *to* $2^1/_2$ *days*. Even solutions of $^1/_{10}\%$ and $^1/_{20}\%$ have this effect. More concentrated solutions, as for instance, a 2% solution, cause a typical and very intense irritation, followed by dense opacities of the cornea. * * * * * * Further experiments were made on large dogs. In these the instillation of a $^1/_{20}\%$ solution into the eyes, produced a profound anæsthesia of the conjunctiva and cornea. * * *"

In a foot note Hirschberg adds: "I have removed a foreign body from the cornea in seven cases after having instilled a solution of 0,01 Erythrophleine muriat., in Aq. sublimat. (1:5000) 5,0 (a $^1/_5\%$ solution). The anæsthesia came on later than after the instillation of cocaine; the patients complained of a burning sensation. Rainbow-colors were seen subsequently."

The substance which I obtained a few days ago from the sender of the circular, Mr. McKelway, was a very fine straw-colored powder, which readily dissolved in water, giving a perfectly clear odorless solution. Some of a $^1/_{10}\%$ solution when heated with sulphuric acid took on a slightly yellowish-red tint, (like that of pale tea-roses), but not the rose color, which Lewin describes as being characteristic of the alkaloid itself. I have so far experimented with a $^1/_{20}\%$ solution only with the following results.

One drop of this solution instilled into the lower cul-de-sac of the normal human eye produces a *noticable* anæsthesia of the conjunctiva to the touch in two minutes, which becomes *profound* in from seven to nine minutes. The cornea becomes anæsthetic much later and not as profoundly so as the conjunctiva. Even after twenty minutes, although the touch to the cornea can be born, it is still felt. The blood-vessels of the conjunctiva do not seem to be influenced by this drug, certainly there is nothing like the anæmia following the instilla-

tion of cocaine. The pupil and accommodation are not influenced by this drug. There is, however, a disagreeable burning sensation complained of which lasts for some time. Rainbow-colors, like Hirschberg, I have not seen, probably, because the solution I applied is so much weaker. The anæsthesia produced by one such drop lasts for the cornea about four hours and is at that time already considerably diminished in the conjunctiva.

If one drop of a $^1/_{20}\%$ solution is applied directly to the cornea, this membrane becomes anæsthetic to the touch in about ten minutes, but not as quickly nor as profoundly so, as does the conjunctiva.

In a case of trachoma with ulcus corneæ and intense photophobia, two drops of the solution allowed the patient to open her eye easily after ten minutes and the pain, complained of previously, disappeared. The patient felt considerably easier, but when seen twenty hours after this instillation, the conjunctiva was but very slightly anæsthetic, the cornea not at all. However, one drop of the solution now sufficed to produce a deep anæsthesia in four minutes, so that the touching with copper was barely felt. This is more than in my experience can be obtained with cocaine.

In a case of traumatic iritis the instillation of two drops of the $^1/_{20}\%$ solution caused evidently a considerable increase in the pain, which lasted six hours, perhaps due to an increase of the intra-ocular tension.

From these few experiments it is plain, that we have in the new remedy one that may, when its proper realm of action has been established, be a very valuable addition to our therapeutical agents. To find just where and when its application is most useful and indicated, must be the aim of all who have a chance to experiment with it. The marked difference in its action upon the conjunctiva on the one, and upon the cornea on the other hand is a strange phenomenon. The seeing of rainbow-colors of which Hirschberg speaks would, it seems, indicate a positive influence of the drug on the intra-ocular pressure, which should guard us from using it in eyes with a glaucomatous tendency.

Further experiences with this drug we shall report in our next issue.

THE ADVANTAGE OF OPERATING EARLY FOR STRABISMUS.[1]

BY J. F. FULTON, M. D., PH. D.

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There is no operation that the ophthalmic surgeon feels more certain of accomplishing or that which his patient usually desires more than the operation for strabismus. We, as a rule, are safe in promising to straighten the eyes of all who come to us for that purpose, provided they permit us to operate as often as necessary. But there are some other troubles connected with this deformity which are not so easily overcome, namely, diplopia and the amblyopia so frequently met with in these cases, and it is to these two symptoms that the ophthalmic surgeon should direct his attention chiefly, in the treatment of this class of cases.

I agree with Soelberg Wells that the active suppression of the pseudo-image results frequently in amblyopia, and this amblyopia increases rapidly in children or shortly after the strabismus first shows itself. In this connection he says: "The operation should never be unnecessarily deferred. The question is often debated as to whether a child of two or three years of age should be operated upon for squint or whether it is not better to postpone an operation until it is much older My opinion is very strongly opposed to the latter practice, and is urgently in favor of the operation being performed as soon as possible whilst binocular vision still exists and the sight of the squinting eye is good. When it is, however, absolutely

[1]Read before the Section of Ophthalmology of the Ninth International Medical Congress.

necessary to postpone the operation, the vision of the squinting eye should be frequently practiced, and each eye separately used for reading, etc.

Stellwag, although strongly opposed to that of operating before puberty, urges the necessity or importance of separate exercise for the squinting eye, in order, he says, to avoid the development of a central anæsthesia. For this purpose, he says, it is necessary to exclude from the visual act the eye usually employed for fixation, and to exercise the defective eye several times daily. I think this whole subject can be made clear by recognizing the fact which clinical and careful investigation seem to distinctly prove, that amblyopia met with in cases of squinting is either primary or secondary. What I mean by primary amblyopia is that which is due to some defect either in the structure of the eye or in its perceptive powers, and is always congenital. For this there can be nothing done in the way of operating or treating the strabismus, but I am very positive in my opinion that a large proportion at least, of the cases of amblyopia thus met with is secondary to, and the result of the strabismus. It is one of the laws of nature, to which there are certainly but few exceptions, that suppression of activity will result in deterioration of the function of the part. It is so here. The objects not being focused on the same place on either retina results in a double image, and finally in a suppression of the image in one eye and the disuse of that organ, which gradually, in some cases very rapidly, loses its functional activity. As proof of this, how rare it is to meet with amblyopia in alternating squint, or in those cases in which the refraction and acuteness of vision are alike in the two eyes. In each it is a mere matter of accident which eye will be directed toward the object, and which toward the nose, the reason of this being that both eyes are exercised alike. But in the other class of cases in which the refraction of the eyes is different, the vision of the best eye is used by instinct, and the squinting is always done by the defective eye. The squint is then said to be fixed, and under such circumstances the vision of the squinting eye will usually undergo a steady, progressive deterioration." (Carter.)

And I maintain that this progressive deterioration of vision can be prevented in a great many cases by curing the squint, either by the use of glasses, or if necessary, by an early operation. In this connection, and in proof of what I have just affirmed, permit me to refer to the history of a few cases:

A young man, 18 years of age, came under my treatment some years ago, with the following history: He had been examined eight years previous to this by an oculist. His books showed the condition of his vision to be as follows: Acuteness of vision in right eye $^{20}/_{xx}$; the vision in the left eye $^{20}/_{xxx}$. This eye was hypermetropic to about one diopter. Vision could be raised to normal by +0.75 glass. Convergent strabismus had already commenced. He was advised to use atropine and glasses, but for some reason this had been neglected, and the strabismus developed, and also, as the future history proved, deterioration of vision in the left eye developed also. Just before coming to me he met with an unfortunate accident. A little boy shot a horse-shoe nail into the right eye which entirely destroyed the sight. It was necessary to enucleate it. The vision of the left eye was $^{20}/_{lxxx}$; even this vision was uncertain, as he had the so-called "come-and-go" acuteness of vision. This could be improved but very slightly by the correcting glass, but by constant and presevering exercise the acuteness of vision was gradually improved, and continues to improve up to the present time. He now reads $^{20}/_{xxx}$. This case certainly proves beyond the possibility of doubt that amblyopia does develop as strabismus develops, and that it can be relieved by proper treatment and systematic exercise. Is it not possible and reasonable to suppose that had the operation for strabismus been performed when this first developed that deterioration of vision in this eye would have been prevented?

I wish here to relate briefly the history of another case which has strongly impressed me as to the importance of in some way relieving strabismus as soon after it shows itself as possible. Two members of the same family, a little boy and little girl, each had convergent strabismus, apparently the result of a low degree of hypermetropia. Strabismus began to develop

in each about the sixth year. The boy was eight years of age and the girl nearly seven when they came under my observation. The left eye of both children was slightly amblyopic, each reading in the defective eye $^{20}/_{xl}$, as near as could be made out in children so young. The strabismus was well marked reaching a little over three lines in both. An operation was advised for both, but the parents consented only to have the operation performed on the elder child at that time. Both, however, had the refraction carefully corrected with glasses. The child upon whom the operation was performed had binocular vision perfectly restored, and his acuteness of vision remained at $^{20}/_{xxx}$ with the correcting glass which he always used. The strabismus remained stationary in the younger child, but the amblyopia increased, as an examination several years afterward, showed distinctly. I think it is but fair to conclude that had this child been properly treated she would not have suffered deterioration of vision in her defective eye.

Anyone who has had much experience in the treatment of squint recognize hosw difficult it is to restore binocular vision after it has once been lost, yet this is an object of paramount importance, and I maintain that it is much easier to do this by operating early, soon after strabismus shows itself, than it is to operate later in life. I have from time to time carefully examined young people who had their strabismus cured by a timely and proper operation early in life, and in but few such cases have been able to demonstrate the absence of binocular vision. All the defects of the operation, the deformities resulting from it, such as sinking of the caruncle, are less likely to take place after an operation on children, in my experience, than after operating on adults. The loss of relationship between the "accommodation" and the internal recti muscle, together with asthenopia, so frequently met with after this operation has been performed upon adults, is much more easily overcome, or I should say much more easily overcome by nature herself, when the operation is done on children, than at other periods of life. And it so frequently happens that the treatment of asthenopia after the operation has been success-

fully performed, is much more tedious and much more annoying to both patient and surgeon than any other part of the treatment. After strabismus has lasted for a number of years it frequently results in most serious loss of proportionate strength between the internal and the external recti muscles. There is very great thickening and contraction of the internal and corresponding elongation and atrophy of the external, rendering the trouble all the more difficult to remove. Such a course is prevented by operating early in life.

These conclusions are arrived at by actual experience and clinical observation. I am well aware that they are contrary to our usually accepted theories on the subject. But theories are far-fetched attempts at explanation, and should not be permitted to weigh in the balance with experience. There are many obscure points in ophthalmology which cannot be explained by any theory. We must learn to look such calmly in the face, in order to undertake with courage the task of elucidating them. General medicine, which has for ages been the object of investigation, together with all branches of science, affords many more unfilled gaps than does ophthalmology which was, so to speak, born but yesterday. Hence, let us not despair, but seek diligently to analyze the many facts that practical experience presents every day, and light will eventually dawn upon these obscure subjects.

EXCESSIVE HÆMORRHAGE OF SEVERAL HOURS DURATION, BEGINNING TWO AND A HALF HOURS AFTER EXTRACTION OF SENILE CATARACT.

BY DR. B. E. FRYER, U. S. A., KANSAS CITY.

Every ophthalmic surgeon has met with cases in which either during or after the removal of cataract there was more or less bleeding of short duration, but I think that cases like the following in which the hæmorrhage was not only excessive, (when its source is considered,) but also of long continuance, must be infrequent, and sufficiently so to warrant record.

The subject of this cataract was a Mrs. D., aged 75 years, of Irish birth, spare habit, but fairly well nourished for her age. Patient first came to me Nov. 10, 1887. I found she had cataract in each eye, both of them hypermature. General health good: no history of syphilis or rheumatism.

The field of vision was good, though the perception of the light used in making the test indicated V. to be below normal for the condition. The pupils could not, it was found, be fully dilated, and were not expanded over a fourth even after the use of atropine for some days. It was decided to extract the cataract of the right eye. Operation was done Dec. 15, 1887. Atropine instillations had been used up to within four days of the operation. A drop of a one per cent. solution of Merck's cocaine was instilled into the eye every twenty minutes prior to the operation, until five instillations were had. Then just before the operation a few drops more were placed in each conjunctival sac.

The incision was made with a Graefe knife, very keen in point and edge. The wound was wholly in the cornea—about two-fifths of its upper portion being included in the cut, which

latter was very smooth and the line of its curve symmetrical, and without the slightest raggedness. In making the iridectomy the iris tore slightly at the first attempt at seizure by the forceps, but at the next trial a sufficient part of it was brought out and snipped off smoothly with Wecker's iris scissors. A small iridectomy only was made. A mere tinge of blood followed this, but not enough of it went into the anterior chamber to interfere with a full view of the lens while making use of the cystotome, and the lens was delivered through the incision with but very slight pressure by the vulcanite curette. No presentation or escape of vitreous, and no flattening or wrinkling of cornea followed, and there was no blood visible in the anterior chamber.

A rapid test observed that fingers were readily counted. The eyes were placed under the usual dressing and the patient put quietly to bed.

About two hours and a half after the operation the woman felt a sharp pain in the operated eye, which continuing, she called the nurse (one of experience in the nursing of eye cases), and the latter at once observing that blood had oozed through the dressings, and was running down the face, removed the bandage and began gently wiping the blood from the cheek and lids.

The bleeding continued until I saw the patient four hours after it had begun. The dressing which had been reapplied just before this, was saturated with blood. On examining the eye I found that the lips of the wound were pressed apart by a clot the whole length of the incision, and blood was oozing from about this clot quite rapidly. The clot I carefully removed, and cleansed the conjunctival sac, and applied the dressing, making some pressure with the bandage. This checked, but did not completely end the bleeding.

The blood appeared to come from the stump of the iris or behind it, but this was, of course, somewhat of a conjecture. The blood was mainly arterial. I saw the patient the next morning when the hæmorrhage had ceased, though, from the saturation of the dressing, it had probably lasted in a lessened

amount for some time after the application of the last bandage. Examination now revealed another though smaller blood clot in the wound lips, which was removed; anterior chamber full of blood. V. obliterated.

Examination of the eye now, seven weeks after the operation, shows it to be somewhat shrunken, the conjunctiva bulbi of a dark purplish red, the cornea of correct conformation, but semi-opaque. V. entirely gone.

The source of the hæmorrhage was in all probability from the stump of the iris. No unusual traction however, had been made on this membrane during the iridectomy or at any time, and no bruising occurred at the delivery of the lens. In fact the whole operation, in all its steps, was very regular and smooth, and during it the patient was calm and quiet, and gave no trouble.

It is to be hoped that other operators who may have had similar experience as that furnished by this case, may put it on record also.

THE NATURAL HISTORY OF STRABISMUS CONVERGENS.

BY JAMES LAUNCELOT MINOR, M. D., MEMPHIS, TENN.

Amongst the laity, and the general practitioner as well, the idea is entertained that "children often out-grow their squint;" but we, as ophthalmologists, have been taught by both precept and example, that operative measures in early life, are imperative for the correction of convergent strabismus.

Evidence is not wanting, however, to show that some of our number are dissenters from this view. I was impressed with this fact at the meeting of the American Ophthalmological Society in 1885, where Dr. Seely thus expressed himself on the subject, "When we look over our statistics, what per cent. of immediate results are more than cosmetic? My early conviction, *that something should be left for time and glasses*, long since grew into an absolute law of action, for I became thoroughly persuaded that *immediate perfection* meant *later in life, insufficiency or even divergence.*"

A study of the natural history of the affection will probably throw some light on the subject; and with this idea in view, I have collected the notes of such cases as I have seen. They are brief and incomplete, and the number is small, for they were discovered accidentally; nevertheless, they will serve the purpose of illustrating the main features of the affection. I present the notes of six cases of convergent squint, none of which received treatment of any kind—each case was left to itself, and in every instance, the ultimate result, was a practical correction of the deformity.

Four cases had refractive errors, of the hyperopic type. One had an intra-ocular lesion, and one, corneal opacity. How frequently a spontaneous correction occurs, it is impossible to

state, for my cases were discovered accidentally, but it must be rare. This small number, is, I know, too small to admit of general conclusions, but it shows that there is foundation for the popular belief that squint does sometimes correct itself. It may be urged, that if correction occurs without treatment, the benefits conferred by operative measures in early life, are not only transitory, but may be followed by over-correction—divergence—later on. Yet this does not necessarily condemn the operation, for the number of spontaneous cases is small; and the period of waiting and uncertainty is objectionable. And too, those who believe in the theory of *amblyopia ex anopsia*, claim to re-establish binocular vision by an operation, and thereby prevent or improve faulty vision, and prevent a return of the squint. If the effect of the operation is purely cosmetic—as I believe it to be in the majority of cases—an operation in early life is advisable, because of the good it confers; immediate benefit can be certainly obtained, which will, in all probability be permanent; and if in after years there should be over-correction, temporary relief will have been obtained, and a second operation may secure final correction.

So far as insufficiency of the recti muscles is concerned, my experience does not enable me to speak; but as the muscular condition is faulty to begin with, operative measures would not necessarily give rise to asthenopic symptoms, for I have seen these symptoms in cases of permanent squint, where nothing had been done except the wearing of correcting glasses, and the glasses did not afford perfect relief. Atropine and glasses do correct some cases of squint, but when these agents fail, recourse must be had to tenotomy.

Case I. M. C., female, æt. 46, years. Seen Sept. 1884, at New York Eye and Ear Infirmary. Strabismus convergens appeared in early childhood, and remained until she was twenty years old, when it began to diminish, and finally disappeared permanently ten years ago. The left eye was the squinting one. The eyes are now perfectly straight, and act in unison.

Diplopia was never experienced, nor can it be produced.

O. D.+5 D. S. V=$^{20}/_{xx}$ O. S. V=$^{10}/_{cc}$, which cannot be improved. Ophthalmoscope shows hyperopia of 5 D. O. U. and no abnormality of the fundus of either eye. Treatment was never sought before, and she now comes for glasses.

CASE II. P. D., male, æt. 16 years. Seen by me at Dr. H. D. Noyes' office, in New York, in 1884. Convergent squint—the right eye turning in—appeared during infancy, and remained until two years ago, when it disappeared, and has remained permanently absent since. The eyes are straight and they act in concert, never had diplopia, nor can I produce it. O. D. V=$^{20}/_{cc}$. O. S. V=$^{20}/_{xx}$. Ophthalmoscope, shows, in *right eye* a patch of retino-choroidal atrophy, about the size of the optic disc, near the macula lutea—otherwise normal. *Left eye* normal. *Both* eyes emmetropic. Treatment was never sought before, and he now comes for conjunctivitis.

CASE III. The notes of this case are furnished by my friend Dr. D. C. Cooks, of New York. E. K. æt. $15^{1}/_{2}$ years, female. Seen, May 1880, for asthenopic symptoms—was cross-eyed when four years old. The eyes are now straight, never received treatment. O. U.+10 s. V=$^{20}/_{xxx}$. Ophthalmoscope shows hyperopia $^{1}/_{8}$. Fundus normal O. U.

CASE IV. F. D., male, æt. 50. Seen at my office in New York, June 1885. Eyes became crossed in childhood, and remained so until he was about twenty-five years old. They have been straight ever since. He began the use of glasses five years later, and has continued to wear them. O. D.+2. D. s. ⌒+1.50 D. c. axis 6.5°. V=$^{20}/_{xxx}$ O. S.+2.50 c. ax. 15° ⌒—2. D. c. ax. 105° V=$^{20}/_{xl}$. The left was the squinting eye. Ophthalmoscope shows refractive error only.

CASE V. J. B. æt. 30, male. Seen in Memphis, Oct. 1886. Cross-eyed in early life, but for the past 14 years, the eyes have been parallel. The left eye was the squinting one, with which he has never seen well. Never had diplopia, nor can it be produced. O. D. V=$^{20}/_{xviii}$, and refraction emmetropic O. S. $^{10}/_{cc}$., no improvement with glasses. Ophthalmoscope shows high degree of irregular astigmatism. Never received treatment before, and comes now for conjunctivitis.

CASE VI. D. P., female, æt. 20. Seen in Memphis, July 1887. Was cross-eyed when a child, and remained so until she was about 16 years old. Eyes now parallel, and act in concert. Has binocular vision. O. D., the eye which squinted $V=^{20}/_{xl}$. Unimproved with glasses. Slight haziness of cornea, and emmetropic. O. S. $V=^{20}/_{xx}$ and emmetropic. The right eye was sore in early life—probably an ulcer of the cornea—which caused the squint.

FITTING SPECTACLE FRAMES TO THE FACE.

BY EDWARD JACKSON, A. M., M. D.,

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A CLINICAL LECTURE.

GENTLEMEN:—Most of you, who enter upon the practice of ophthalmology outside of the larger cities, will be compelled to furnish patients with glasses. You will be unable to find any jeweler, or optician, fitted by previous experience to take charge of your prescriptions, or ready and willing to fit himself for the work. And you can undertake this in strict confirmity to the highest standard of ethics, by practicing simple honesty. Do not attempt to attract the unthinking, by having it understood, that you do not charge for examining the eyes, but only for the glasses. But fix definitely your scale of professional charges, and look to these, and to these alone, for recompense for your professional services.

Then if glasses are needed, and the patient has no better way of obtaining them, get them for him, and charge him just the ordinary retail price that he would be charged by any honest competent optician. Adhere rigidly to this rule, and when the expenses are paid and the time and annoyance counted, the discount allowed by the wholesale optican will be no temptation to advice the getting of glasses that are not needed. There is nothing discreditable or beneath the dignity of the profession, in furnishing to a patient who cannot so well get themin any other way, the glasses he needs, at the regular market price. But it is dishonorable, unprofessional, swindling, for a doctor to take advantage of his patient's confidence and ignorance, to extort from him more money for a pair of glasses than those glasses or worth; or to pretend to charge for glas-

ses, when he is really charging for something else. And no man will keep his professional judgement thoroughly honest and clear-sighted, who makes the compensation for his professional labor dependent upon the sale of a pair of glasses.

But even if you are not compelled to furnish glasses, you will find it worth your while to see that each patient for whom they are ordered has them properly fitted ; so that a good understanding of this subject is of practical importance to all.

The function of the frame is to place and retain the glass in the proper position before the eye. As a rule, it is performed best by spectacle with what are known as "hook-temples," while eye-glasses are the least satisfactory, especially for cylindrical lenses. But in advising as to the selection of frames it should be remembered, that the lenses do good only when worn. And if one kind of frame would be worn sometimes when others would not, the fact constitutes a great advantage for that particular kind of frame, to be carefully weighed against any disadvantages.

The frames should be so adjusted that when the glasses are in use the visual axes shall pass through the centres of the "eyes" or a little to the inner side of the centres. The portion of the "eye-wire" or edge of the lens next the nose, on account of the normal limitation of the field of vision in that direction, is less noticed and less annoying, than the part toward the temple. Hence it is better to have the frames a little too wide than a little to narrow. To determine the proper distance between the centres of the glasses, wc measure the distance between the centres of the pupils; by holding in front of the eyes, parallel to the front of the face and as close as possible, a scale with its zero at the centre of one pupil, and note which division of the scale is opposite the centre of the other pupil. While this distance is being measured the eyes should be directed toward some distant object; and as the observer's eye is necessarily not more than two or three feet away, the distance obtained on the scale will be a little less than the true distance. So that if the glasses are to be used for distant vision, it is proper to add a millimetre, or one-sixteenth of an inch.

But if they are to be used at less than two feet, the same distance may be subtracted. To ascertain if a given pair of frames are of the proper width, we are not compelled to measure from the centre of one "eye" to the centre of the other; but may obtain just the same distance by measuring from the right side of one to the right side of the other. You will understand, of course, that what I am saying of centres refers only to the frames, and not to the mounting of the glasses in the frames, although in most cases the optical centre of the lens is made to correspond to the centre of the frame.

The height of the frames before the eyes should of course be such that there will be the least liability to look over or under the glasses. This height is determined by the work for which the glasses are to be used, and the relative heights of the bridge of the nose and the "bridge" of the frames. The higher the bridge of the nose the higher it raises the frames. But the higher the "bridge" of the frame, the lower it allows the "eyes," and the glasses they contain, to fall. The proper height for the bridge is to be found by trying on a pair of frames. The nearer they are to fitting, the better; but those which are very far from fitting are better than none for this purpose; and then measuring how much too high, or too low, the "eyes" come, and making the necessary correction for height.

In trying frames for this purpose, care must be taken to place the bridge in what might be called its "natural" position, the position toward which it will always tend when the frames are worn. For if fitted to any other position it will be continually getting out of place.

The height of the bridge is measured from the line joining the centres of the glasses, or what is the same thing, the line running from the joint where the temple is attached to the "front" on one side, to the same joint on the other side. To measure this height lay the spectacles, front downward, so that a ruled line or the bottom of a sheet of paper shall just pass from joint to joint; and measure up from this line to the centre of the bridge.

As a rule the glasses should be far enough in front of the

eyes to avoid being touched by the lashes; because if they do touch, the glass quickly becomes soiled. Ossasionally, however, persons who are strongly myopic prefer to have their glasses as close to their eyes as possible, since they are able thus to obtain larger, clear retinal images, than with the stronger lenses which would be necessary if placed farther from the eye.

Again, in high hyperopia, especially if associated with amblyopia, it is sometimes worth while to place the glasses further from the eyes than would be necessary simply to escape the lashes, in order to obtain the larger retinal image given by removing the correcting lens in that direction.

The adjustment of the frames in this direction is accomplished by putting the centre of the bridge "out" or "in" from the plane of the glasses. When the bridge of the nose is prominent, or the eyes deep-set. the bridge of the frames must extend well forward, or "out." But if the nose is flat and the eyes relatively prominent, the glasses must be carried forward by bringing the centre of the bridge "in." To determine this dimension of the frame, we again try on a frame. Placing the bridge in its "natural" position we note, if the lashes touch the glass, how much it must be carried forward to escape them or if they do not touch, how much closer it might be brought, without coming in contact with them; this distance giving, in connection with the distance "out" or "in" of the bridge tried, the dimension for the frame that will be suited to this particular face.

Thus the width between the centres of the glasses, their height, and their distance in front of the eyes, all depend on the shape and size of the nose-plate, or "brige." Various styles of bridge are made, the most generally useful being the one called "saddle bridge", which is made of various sizes and patterns, and which is capable of wide and accurate adaptation to the needs of the individual case.

There are other adjustments which do not depend upon the shape of the bridge; although, at first glance they might be expected to do so. First, the plane of the glass should be per-

pendicular to the direction of the visual axis, or as nearly so as may be. For distant vision the glass should face directly forward, while for ordinary reading, writing, etc., the glass should face decidedly downward. Now, the direction in which the glass faces is determined by the angle which the temples make with the plane of the glasses. When the temples are perpendicular to this plane the glasses look forward, when the temples are turned down the glasses look rather downward.

Again, to have both glasses the same height before the eyes, the temples must be equally turned down. If one glass always inclines to fall lower than the other, it becomes very annoying to the wearer, not only because the eye-wire is constantly seen double, but also because the difference in height of the optical centres of the two lenses gives the effect of a prism with its base up or down, liable to cause symptoms of eye-strain.

When this defect in the fitting of the frames is noticed it is to be remedied by bending down the temple attached to the glass that falls too low, thus throwing the glass up, or by bending up the temple attached to the glass that rides too high, and so bringing that glass down to the level of its fellow.

If the lashes touch one glass but not the other, showing that one comes closer to the eye than the other, the fault generally lies in the fact that one temple is bent out more, diverges more than the other; the glass on the side of the divergent temple tending to come too close to the eye. This is to be remedied by making the direction of both temples perpendicular to that of the "front", or equally and slightly divergent as they go back.

When spectacles are first worn, especially if they are worn constantly, they are apt to make the skin somewhat sore at such points as they come in contact with it. They should, therefore, be fitted rather loosely at first; and after a time, when the skin has become accustomed to the pressure they may be tightened up. Hook-temples should, when first adjusted, touch the temples, without making undue pressure. They become more widely spread as they are worn. When

hook-temples are left too loose they allow the glasses so slip too far on the nose, even when the bridge has been properly adjusted, but, on the other hand, if the bridge has been made too high, so that the glasses fall too low when it is in its "natural" position, no amount of tightening the temples will cause the glasses to keep their place.

I have not called attentian to the peculiarities of the faces which we have been fitting to-day, because the variety of faces is infinite, and they cannot be profitably considered in groups. You must master the general principles of the work, and then make each individual case a special study.

Let me remind you that it is important that the frames should fit, not only at first, but as long as they are worn When a patient comes with a history that glasses at first satisfactory are so no longer, do not at once conclude that his refraction, or the state of the recti muscles has changed. But as you enquire whether a prism or a cylinder has been out of the frames at some time and misplaced, notice whether the frames will keep the lenses in their proper position.

TRANSLATION.

EXTERNAL OPHTHALMOPLEGIA FOLLOWING DIPHTHERIA OF THE THROAT.

BY DR. O. EWETSKY.

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Among the affections of the eye which we observe as sequels of diphtheria of the throat, the paralysis of the ciliary muscles is the most frequent. The paralyses of the external ocular muscles are rare, and according to Alfred Graefe, their existence is directly dependent on the character of the epidemic. This author who practices in a country which is frequently visited by diphtheria, has had occasion to see two cases only, one in which the superior oblique muscle was paralyzed, and another in which the two abducens muscles were inactive. On the other hand Pagenstecher has seen a great many paralyses of the muscles of the eye during a widely spread and prolonged epidemic. Recent observations made in Hirschberg's clinic and published by Remak, have also shown that the paralyses of the muscles of the eye are more frequent than has so far been admitted. To 100 cases of post-diphtheritic paralysis of the accommodation, there have been found ten cases of paralysis of one or the other of the external muscles. In the same way Rosenmeyer has found two cases combined with paresis of the two external recti in ten cases of paralysis of the accommodation.

In extremely rare cases all the external muscles of the eye are paralyzed from diphtheria. Such cases have been described by Uhthoff and Mendel. The rarity of such cases prompts me

to publish a new observation; but before describing it I will shortly report the two cases of these authors.

Uhthoff's Case.—A small boy, ten years of age. The diphtheria of the throat lasted from the first to the seventeenth of September, 1883, and was followed by paralysis of the palate. Towards the end of the same month paralysis of the accommodation. On the 10th of October paralysis of the external muscles of the eye, and a few days later total immobility of both eyes. On both sides slight ptosis, pupils normal and reacting well to light. Hypermetropia 2-D, V=1. No change in the fundus, paresis of accommodation. Later on very marked paresis of the lower extremities, total absence of the knee-jerk, normal sensibility, slight sensation of weakness in the upper extremities, no ataxia. Towards the end of October return of the accommodation to the normal, the paralysis of the ocular muscles lasted about one month. A little later the lower extremities became normally active, the knee-jerk, however, only returned in January 1884.

Mendel's Case.—Little boy, eight years old. Diphtheria of the throat lasting from the 22d to the 28th of September 1883. On the 4th of October paralysis of the palate. On the 2d of November sight impaired and weakness of both the upper and lower extremities. Ptosis on both sides. On the right side paresis of the external, superior and inferior recti muscles; on the left paresis of all the recti muscles, no paralysis of accommodation. Further on paresis of the right facial-nerve and the nerves of the neck, paralysis of the palate, trembling of tongue, ataxia of the upper and lower extremities with conservation of the muscular force, normal sensibility throughout, exaggerated sensibility for pain in the lower extremities. Absence of the knee-jerk, persistence of all the skin reflexes over the whole skin. Pulse 100, temperature 38 (Cels.). Death on Nov 11th, with symptoms of paralysis of lungs, ten days after the appearance of the paralysis of the eyes.

At the microscopical examination of the brain a considerable hyperaemia of the small arteries and capillaries was found from the anterior corpora quadrigemina to the crossing of the

pyramides, and in different places numerous extravasations, one of which in the right abducens nerve near the pons Varolii. No changes were found in the walls of the blood vessels, their lumen was nowhere obliterated, no changes in the cells of the nuclei of the common oculo-motor, nor the abducens, the pneumogastric, or hypoglossus nerves. In the muscles of the common oculo-motor nerve the cells were enlarged and looked as if inflated. In the nerves of the base of the brain manifest signs of an interstitial and medullary neuritis were found in the shape of an increase of the nuclei of the neurilemma and changes in the myeline sheaths.

I now proceed to the description of my own observation.

L. F., eight years old, was brought to me at the dispensary of the Society of Russian physicians on the 25th of November 1886. At first sight one is struck by the ptosis of the upper lids which veil-like cover almost the whole cornea. Only with a very great effort the patient can uncover a small portion of the pupil. At the same time the longitudinal folds of the forehead become more visible which shows that the frontalis muscle does part of the lifting. This action of the frontalis is the more manifest when, the eye being closed, the skin at the superior margin of the orbit is compressed with the finger, and thus the trasmission of the contractions of the frontalis is annulled. The patient is then totally unable to open the eyes. From this it is evident that the patient suffers on both sides from a complete paralysis of both levator palpebrae superioris muscles. This paralytic ptosis forces the child to throw the head back in order to see at least the objects which lie at a level with the eyes. The external aspect of the eye-balls is unchanged: conjunctiva, cornea, and iris are normal. The pupils are equal, a little more dilated than normal and react well to the light. The chief trouble lies in the loss of motility. The movements of the eyes upwards and downwards are absolutely impossible. The eyes can be moved horizontally, but to a very limited degree. The patient corrects this lack of motility of the eyes by corresponding movements of the head. Emmetropia in both eyes; V. L.=$^{15}/_{xx}$, R. E=$^{15}/_{xxx}$.

With both eyes patient reads the finest print at less than ten centimetres. The visual field and color-sense are normal.

The patient speaks with a very pronounced nasal twang, so that it is difficult to understand her. This symptom had come on at the same time with the eye-symptoms. There is a complete paralysis of the palate, the uvula is motionless without inclining to the side. The mucous membrane of the throat is insensible to the touch. Dr. A. Botkine to whom I directed the patient found that in all other respects her nervous system was normal.

Since this ophthalmoplegia with paralysis of the palate reminded me of the already mentioned cases of Uhthoff and Mendel, I supposed that the etiology was the same. And, in fact, the mother stated that two weeks previously the little girl had complained of a sore throat with pain during the act of deglutition, but that it had passed off in two days and had qeen apparently of so little importance, that she did not even stay in bed. Three days before the ophthalmoplegia occurred, she complained of head-aches, which ceased with the first appearance of the ophthalmoplegia. The latter commenced on the evening of the 21st of November, as on this day the family for the first time noticed the nasal twang and the change in the eyes. The child, as the mother expressed it, had sleepy eyes, but she could still lift the lids. On the 23rd the ptosis was more pronounced as also the nasal twang. The affection, therefore, had been in existence for four days only and had attained the degree of development above described within so short a period. I should mention yet, that the father had had syphilis, that the child had been born at full term, that when five months old she had some kind of a skin-eruption, but had not suffered from any disease since.

I prescribed small doses of iodide of potassium. The affection progressed in the following way:

Nov. 28. Less ptosis; the free margin of the lids can be raised to the middle of the pupil; small amelioration in the mobility in the horizontal, and very slight mobility in the vertical direction. The nasal twang less pronounced.

Dec. 2. The lids are raised to the upper edge of the pupil, lateral movements more free, motility upward and downward as yet very insignificant. Pronunciation better.

Dec. 9. No more ptosis, motility of left eye perfectly normal; in the right eye paresis of the internal rectus and consequent paralytic divergent strabismus. Nasal twang gone. Palate moveable, the mucous membrane of the throat sensitive.

Dec. 23. Position and motility of both eyes perfectly normal.

We have here a case in which after an undefined morbid process in the throat was developed simultaneously with paralysis of the palate, a paralysis of all the external muscles of the eyeball, while the sphincter of the pupil and the muscles of accommodation remained completely intact. Such a paralysis concerning solely the external ocular muscles is called *ophthalmoplegia externa*, in order to distinguish it from the paralysis of the sphincter of the pupil and the ciliary muscle, which is called *ophthalmoplegia interna.*

Among the different causes of the external ophthalmoplegia, as before mentioned, in rare cases, diphtheria of the throat plays an important role.

Doubtless our patient had suffered from an affection of the throat, yet it is difficult to determine, whether the nature of this process was diphtheritic or simply catarrhal. The answer to this question is the more difficult, since for some time there has been a tendency among physicians and oculists, and which becomes more and more pronounced, to attribute also to a simple angina the faculty of producing subsequently a paralysis of the accommodation and of the nerves. During the throat affection the little girl had not been under the observation of a physician. We know only that the disease had lasted but two days, and that it was so little intense that the child did not even stay in bed, in fact, had afterwards forgotten that she had been affected with angina. Since the apparent lightness of an angina does not suffice to prove that it was not of a diphtheritic character, and since the fact that a simple angina

can subsequently produce paralysis is not as yet firmly established, I am constrained to consider the throat affection of our little patient to have been a light diphtheritic angina.

Since, however, according to Hutchinson, an ophthalmoplegia externa may be due to hereditary syphilis, we will consider the possibility of this etiological factor.

The ophthalmoplegia due to syphilis is of a progressive character; when left alone without treatment it results in death. Only very large doses of iodide of potassium, continued for a prolonged period, can arrest the process, but there is never a complete cure. These few remarks are sufficient to prove that in our case the ophthalmoplegia, which was acute in its onset and healed so well, can not have been due to hereditary syphilis.

The case I just reported is distinguished from the two preceding ones by certain peculiarities to which I want to call attention. The three patients, two boys and one girl, were about of the same age.

It is evident that the lightest form of diphtheria, as for instance in our case, can produce a complete paralysis of all the external muscles of both eyes. In the other two cases the diphtheria had also been of a light character, even in the fatal case of Mendel the local affection was of a moderate degree. In these two cases the local process was almost instantly followed by paralysis of the palate, to which, after three or four weeks, was added the paralysis of the ocular muscles. In my case the paralysis of the palate and the ocular muscles came on simultaneously after the affection of the throat. In two cases the internal muscles of the eye were in no way affected; in Uhthoff's case, there was also a paresis of the accommodation. It is interesting to observe that this paresis did not come on simultaneously with, but two weeks in advance of, the paralysis of the external ocular muscles. The paralyses of the muscles of the eye are developed rapidly, and in a few days they reach their height, yet unfortunately we do not know in what order the different muscles become affected. That is, we do not know whether the loss of motility of the eyes takes

place in the sense of associated movements to the right, to the left, upward or downward, or whether the paralysis progresses gradually in the muscles which are supplied by one and the same nerve. In Uhthoff's case the order in which the movements were re-established was in the sense of the associated movements.

In my case only was the ophthalmoplegia the sole sequel (not counting the paralysis of the palate) of the diphtheria. In the other cases there was ataxia of both extremities and loss of the knee-jerk. In Uhthoff's patient the paralysis of the accommodation disappeared before an improvement could be noticed in the motility of the eyes. Morever, in his case the paralysis of the external muscles of the eye lasted about four weeks—in my case a much shorter period. In Uhthoff's case the atactic symptoms disappeared still much later, about two months after the disappearance of the re-establishment of the normal motility of the eyes; in the same time the knee-jerk also reappeared.

My case, then, differs from those related above by the light form of the local affection in the throat; by the promptness with which the ophthalmoplegia appeared, which came on simultaneously with the paralysis of the palate; by its rapid appearance and disappearance; and finally by the absence of any further complication on the part of the nervous system.

At this date it is generally accepted that the lesion of the motor nerves of the eyes in external ophthalmoplegia is situated in their nuclei. In assuming any other situation it would be difficult to explain the isolated existence of an exclusive paralysis of the external ocular muscles, while the internal muscles of the eye, whose nerves in the trunk of the common oculo-motor nerve lie by the side of the other paralyzed branches, remain perfectly intact. Aside from this purely theoretical consideration, a large number of very important clinical observations supports this opinion, as, for instance, the complication of ophthalmoplegia with bulbar paralysis. Although I fully agree with this view, I must not forget to remind my readers of the fact that in the opinion of a great many neu ro-

pathologists the diphtheritic paralyses are due to a multiple neuritis; in consequence, in their opinion these paralyses are of a peripheral, not of a central origin. It is plain with what difficulties we must wrestle when we try to locate the lesion of the motor nerves of the eyes in diphtheritic external ophthalmoplegia. Mendel's case, above described, decidedly points toward a peripheral origin of the diphtheritic opthalmoplegia. The anatomical examination of the nuclei of the motor nerves of the eye, both of the common and the external one (abducens), was negative in its result; the nerve cells of the nucleus of the common oculo-motor nerve were found to be considerably increased in number, a condition which, according to Charcot, denotes the first stage of a medullary inflammation. In examining the nerve trunks the symptoms of an interstitial and a parenchymatous inflammation were found all over. The absence of a paralysis of the muscle of accommodation and of the sphincter muscle of the pupil, in spite of the inflammatory process in the trunk of the common oculo-motor nerve in this case, remains unexplained.